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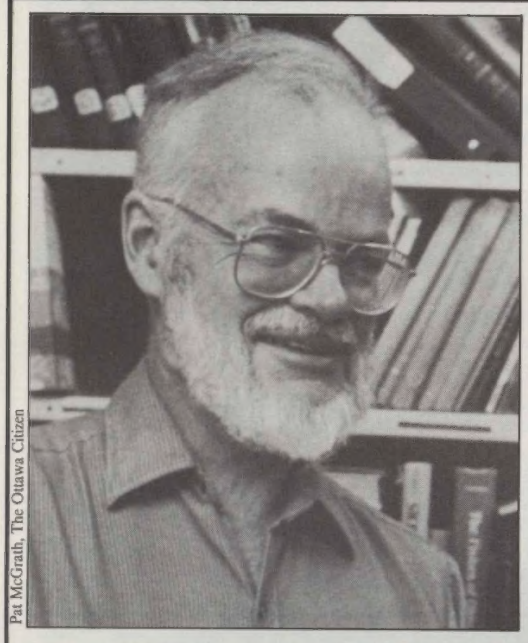
The International Marinelife Alliance



Pat McGrath, The Ottawa Citizen

Don McAllister is hoping to publish a book to help explain cyanide's destructive cycle.

Don E. McAllister, Zoology Division

Netting is safer and cheaper than cyanide, and saves reefs for future generations.

Lynn Funkheaser

*The Tomato Clownfish, **Amphiprion ocellaris**, one of 317 species of fish found in Japan's Shiraho reefs.*

A group of conservationists hopes that fewer aquarium hobbyists will have to bear the agony of watching a $50 tropical fish doing the back float. On a larger scale, the group's efforts may help save coral reef habitats and the Third World people who depend on the reefs for their livelihood.

A few years ago, scuba divers noticed that coral reefs in the Philippines were deteriorating quickly. Dynamiting, a technique used by fishermen to literally blast food fish out of the water, was fingered as one source of the problem. Soil erosion was another, as topsoil from the mainland clouded the water and suffocated the coral. But research pointed out that an illegal method used by aquarium fish collectors was also to blame. The once vibrant reefs were turning into ghostly underwater graveyards as coral was killed by cyanide, a poison used by collectors to stun fish and make them easier to catch.

Hockey puck-sized cyanide tablets are dissolved in plastic squeeze bottles and used to flush doped fish from their hiding places in the reefs. The cyanide also kills some fish and damages the internal organs of the survivors. The collectors themselves suffer from rashes caused by swimming through clouds of cyanide.

Most poisoned fish die on the reefs or on the way to market — the survivors are sold to aquarium hobbyists. They appear healthy and hungry, but their ravenous appetites only mask the fact that their intestines are bleeding internally. The shock of tapping on aquarium glass can kill a stressed fish.

Cyanide poisoning has set back the Philippines' fishing industry, the second most important food source in the country. The harvest from a dead reef is cut by 80 per cent and collectors are pushed into subsistence fishing or low-wage jobs in the cities. Many poor fishermen feed their families with fish killed with cyanide.

About 1000 aquarium fish collectors spread more than 150,000 kg of cyanide on the reefs each year. The gourmet fish industry imports the same amount to catch lapu-lapu, a sea bass sold in Hong Kong as a delicacy. Some collectors spend almost half their $1000 annual income on the poison. Environmentally safe nets would cost $25 per year.

In a reef, cyanide chokes living coral (some colonies of which are 1000 years old) and turns it into a cement-like garden. Dead coral erodes and fallen pieces litter the ocean floor. The reef no longer offers fish refuge from predators, food or a place to lay their eggs, so they abandon it.

It may take up to 35 years before the reef is even halfway recovered, says Dr. Don McAllister, the National Museum of Natural Sciences' (NMNS) Research Curator of Fishes. McAllister is one of a handful of scientists and conservationists in the International Marinelife Alliance (IMA). With dedication and funds scraped mainly from their own pockets, the group wants to stop coral reefs from being poisoned by the people who use them.

Don E. McAllister, Zoology Division

Aquarium fish collectors and fishermen in the Philippines use "bancos," double-outrigger canoes (left), although some poor fishermen can afford only hand-made bamboo rafts (right).

In 1983 a fish collector on an expedition to the Philippines, Steve Robinson, noticed the dead reefs. Like most North American and Australian collectors, Robinson uses nylon nets to catch fish. He demonstrated the technique to the Filipino collectors, pointing out that netting is safer and cheaper than cyanide, and saves the reefs for future generations.

Robinson's plan to wean the collectors of the cyanide habit was stymied by political interference. Since the cyanide method was illegal, the Marcos government denied the problem. Robinson abandoned the project in frustration a year after it began.

Back in North America, Robinson joined Canadian fish behaviour expert Dr. Peter Rubec and American veterinarian Dr. Vaughan Pratt to found IMA. First on the agenda was convincing the aquarium industry to discourage cyanide fishing. Estimating that up to 80 per cent of aquarium fish imported from the Philippines was caught with cyanide, IMA approached the Pet Industry Advisory Council (PIAC). But the council denied that cyanide killed fish — it only stunned them, it claimed. It took tough words and hard facts before the aquarium industry accepted that it was

(continued on page 2)

Don E. McAllister, Zoology Division

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Don E. McAllister, Zoology Division

Steve Robinson (left) with a family of Filipino fishermen.

Don E. McAllister, Zoology Division

Steve Robinson's experience helped him to set up the Netsman training programme for Filipino collectors.

(continued from page 1)

committing suicide by allowing cyanide fishing, and PIAC signed IMA's Netsman agreement in May 1988.

IMA continued the fight, and published their findings in scientific journals and aquarium magazines. A year later McAllister, known for his work with endangered species of fish, became part of IMA's executive.

Teamwork has managed to get at least some of the job done. Pratt, who saw the ravages to the coral reefs firsthand on a diving trip, put his diplomatic skills to work on Filipino politicians. Rubec was devoted to the cause from the beginning because of his love of fishes. Robinson's experience helped him to set up the Netsman training programme for Filipino collectors. McAllister took over IMA's paperwork, wrote project proposals, learned how to balance the books and began publishing a journal, *Sea Wind*, with the help of his home computer. The NMNS has encouraged and supported his conservation work.

The problem, says McAllister, "can be solved rather easily," but getting the attention of aid agencies and the collectors themselves hasn't been simple. IMA enlisted reformed collectors to speak in village squares, schools and churches, to spread the word about netting.

Despite death threats from cyanide sellers and counter-claims that cyanide does not harm fish, the IMA Netsman programme is moving forward with the help of the Aquino government. Next on the agenda is a coral reef repair manual for Filipino collectors, but lack of funding is setting back the project. McAllister is hoping to put out a book with illustrations and simple instructions to help explain cyanide's destructive cycle.

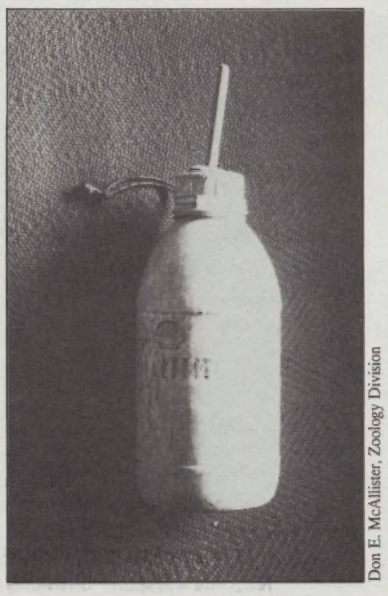
Since the group formed, it has received inquiries from the governments of Sri Lanka and Indonesia about starting netting programmes. IMA also wants to study reports that cyanide is being used on other reefs.

The International Union for Conservation of Nature and Natural Resources (IUCN) asked IMA to do a study of Japan's Shiraho reefs. Working under a tight deadline, the group concluded that a proposed airport calculated to boost an island's economy would destroy the ecological balance of a nearby reef. Their efforts were lauded by the Union, and prompted World Wildlife Fund President and IUCN Vice-President, Prince Philip, to send a letter to the Prime Minister of Japan.

Conserving coral reefs isn't so far away from the ivory tower of academia, notes McAllister, who spent 25 years as Curator of Ichthyology at NMNS. McAllister spends much of his time in a warehouse far away from museum displays, studying scale and tissue samples from an echoing library of pickled fish with calipers and computer. He has traced the family trees of many of Canada's fish, and is developing an international 'data base' of fish that includes the scientific and common names of all freshwater and marine species. The results of his research show up not only in scientific journals, but also in manuals for commercial and sport fishermen. "All kinds of things come from our pickled fish collection," says McAllister with a smile.

Joanne Laucius

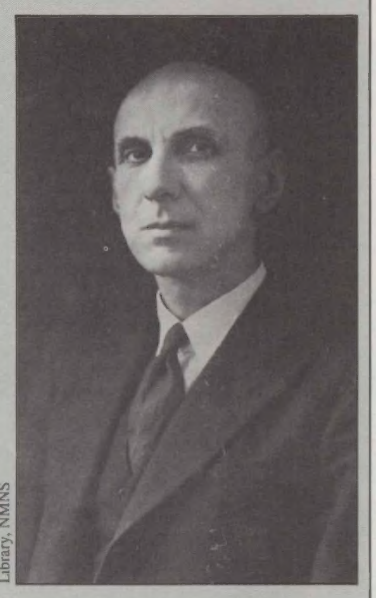
Plastic squeeze bottles are used to spray coral heads with a solution of sodium cyanide to drug aquarium fish for easy capture.



Don E. McAllister, Zoology Division

Readers interested in bringing harmony between people and the sea, and saving rich and beautiful coral reefs, can contact International Marinelife Alliance Canada at 2883 Otterson Drive, Ottawa, Ontario K1V 7B2. Ordinary memberships ($20) and donations are tax deductible.

Glimpses of the Past:
Clyde Patch (1887-1952)



Library, NMNS

Clyde Louis Patch was born in Hiawatha, Kansas, and grew up in Ohio and Michigan. After serving as an apprentice taxidermist for four years in Washington, D.C., the talented Patch worked for the U.S. Department of Agriculture and the American Museum of Natural History. In 1913, he was offered the position of Chief Taxidermist at the Victoria Memorial Museum, later to become the National Museum of Natural Sciences.

Patch was tall, very thin, and according to colleagues, had an air of "undertaker" about him, but amused them with his "smoking." When speaking to someone, he would strike a match and hold it to the bowl of his pipe, then forget to draw as he concentrated on the conversation. The match would burn out and soon he would strike another match and the same thing would happen. Wherever he went, he left piles of burnt matches behind him!

Most of Patch's four decades with the Museum were "lean years" because of two world wars, a depression, and restricted exhibit space. Despite this, a major systematic display of birds was prepared, with mounts of virtually all Canadian species on view. Patch also produced biological dioramas that were very popular with the public, as well as models and mounts for the Museum's School Loans Collection. A perfectionist, he constantly experimented in taxidermy and developed techniques that remain in use.

He was disatisfied with most beaver mounts, finding the beaver to be a difficult subject to work with. To solve this problem, he kept a live beaver in his office so that he could study its movements. His observations helped him to create a large beaver diorama that is still on display.

Herpetological studies were almost non-existent until Patch came to the Museum. Because of his great interest in reptiles and amphibians, his title was changed to Chief Taxidermist and Herpetologist in 1918 and, in 1947, to Biologist. With the help of a network of "correspondents" that he developed across Canada, about 7000 specimens were gathered for the Museum.

However, not everyone could be converted to this interest. One day, a woman came to Patch and nervously said that she had heard that putting a snake around the neck could cure goiter. Happy to show the lady that snakes were not unpleasant, Patch draped a live snake around her quivering, obviously goiterous neck. Unfortunately, the woman let her fear overcome her and ran from the room!

Kim Carter

EDITORIAL

It's really going to happen! The Canadian Museum of Civilization is going to move out of the Victoria Memorial Museum Building. I know, I said that the last time, but think what it means. Your Nature Museum will be taking over the entire building. We will have eight new gallery spaces, and have already begun making plans on what we will do in them. To those who wrote, thank you for the great ideas and advice. To the rest of you dear readers, don't forget, I still want to hear from you about your ideas of what you want to know about the world of nature and how we should explain it to you.

We also have some wonderful plans to make the building more comfortable to be in — an expanded Museum shop, proper restaurant and cafeteria, better school entrance, a gallery space devoted to explaining the Museum's public and research roles, as well as a more welcoming front entrance. Are there other things you think would make your visits more comfortable? More places to sit? Better signs? More restrooms? We are really interested in having your comments.

For those of you who cannot come to the Museum building in Ottawa, we are expanding our programme of exhibits designed to travel to other museums, and initiating a programme of exhibits to libraries, community centres, churches, and schools. I have just seen the first cut of a film called Museum Heroes, which we are producing with TV Ontario and a private film-making company — a most unusual look at the human side of our curators who have made a difference in Canadian history. We are expanding our publishing programme by co-venturing with the private sector publishing industry. What else would you, the non-visitor, like to see us, at the nation's Nature Museum, doing to share our knowledge and collections with you?

Remember, now is the time to write. We are planning our future right now!

Alan R. Emery
Director

B I O M E

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The Whitestone Mammoth

Editor's note: in BIOME Vol. 7:2, an article adapted from a background paper by Dr. C.R. (Dick) Harington, Chief of the Museum's Paleobiology Division, explained how a life-like, life-size group of woolly mammoths was constructed for display outside the Victoria Memorial Museum Building. The discovery of the relatively complete skeleton on which the model of the female is based, the Whitestone Mammoth, has an intriguing history. The following is also adapted from Dick's background paper.

Very large, highly-curved tusks were characteristic of adult males. Females, such as the Whitestone Mammoth, had more gracile, straighter tusks.

In July 1967, during his second year of carrying out field work near Old Crow in the northern Yukon (the richest area for collecting ice age vertebrate remains in Canada), Dick Harington heard a strange story. It had been handed down to some of the natives of Old Crow. The tale involved a "monster" that had broken out of a lake bed near the upper Porcupine River, trudged up that river and died under a bank on Whitestone River, a tributary of Porcupine River.

Bearing in mind that such legends may have a core of truth to them, in this case one that could relate to large ice age animals, and wanting to survey drainage basins associated with the upper Porcupine River in case other rich fossil sites could be located, Dick decided to investigate. He and a field assistant, Peter Lord, left Old Crow in late July for Whitestone River. They travelled upstream by boat in frigid weather, with rapidly dropping water levels. They examined several bluffs and sand bars for fossil bones on the way upstream, but found little of interest. After stopping briefly at Johnson Village, an abandoned Kutchin settlement, they checked the base of a peat-capped bluff on the next bend with little success. Finally, there was no use proceeding farther because the stream was too shallow and they were up on tundra level with no more bluffs in sight.

Having turned back on August 5, Dick recalled that they had not examined the upstream part of the bluff near Johnson Village, so they went ashore there. While Dick was securing the boat, Peter, who was walking downstream, let out a cry and pointed toward the river. In the course of running toward him, Dick noticed a complete mammoth jaw with teeth embedded in sand at the water's edge and then saw the upturned part of a mammoth skull farther out in the water. The rest of the day was spent excavating the skeleton associated with the skull — first the lower jaw, the cranium, forelimbs, a series of vertebrae and ribs and the pelvis. The hindlimbs were missing, and may have been washed downstream. The last and most difficult job was releasing the left tusk, which was almost vertically lodged in the river bottom. Dick and Peter, working with shovels, thigh-high in swift, freezing water, could not make much headway, for as fast as the gravel was scooped away, it was washed back in by the current. In desperation, Peter got on one side of the tusk with Dick on the other. They heaved it back and forth until the suction was released and they tumbled into the water with a complete, beautifully preserved tusk on top of them. The bones were laid out on the bank the way they had been found in the stream and were photographed (later examination of the skull indicated that most of the right tusk had been broken off before the animal died). It was the end of an exciting quest. The monster legend was in part true.

Dick later speculated that the tale had been an attempt to explain two unusual and startling phenomena: the discovery of bones of an unknown, gigantic animal (the "monster") observed near the base of a bluff on Whitestone River, in an area that had once been occupied by people who eventually moved to Old Crow; and the observation of a lake suddenly and violently flushing its turbid water into the Porcupine River farther south — this happens on rare occasions when the river cuts back to the edge of a lake near its margin (the part of the tale involving the "monster" breaking out of a lake bed).

A radiocarbon date on a rib indicates that this female died about 30,000 years ago. Discoveries such as that of the Whitestone Mammoth provide invaluable information about the ice age fauna that survived in unglaciated, grassy tundra areas, hemmed in by ice sheets, in what are now Alaska and the Yukon Territory.

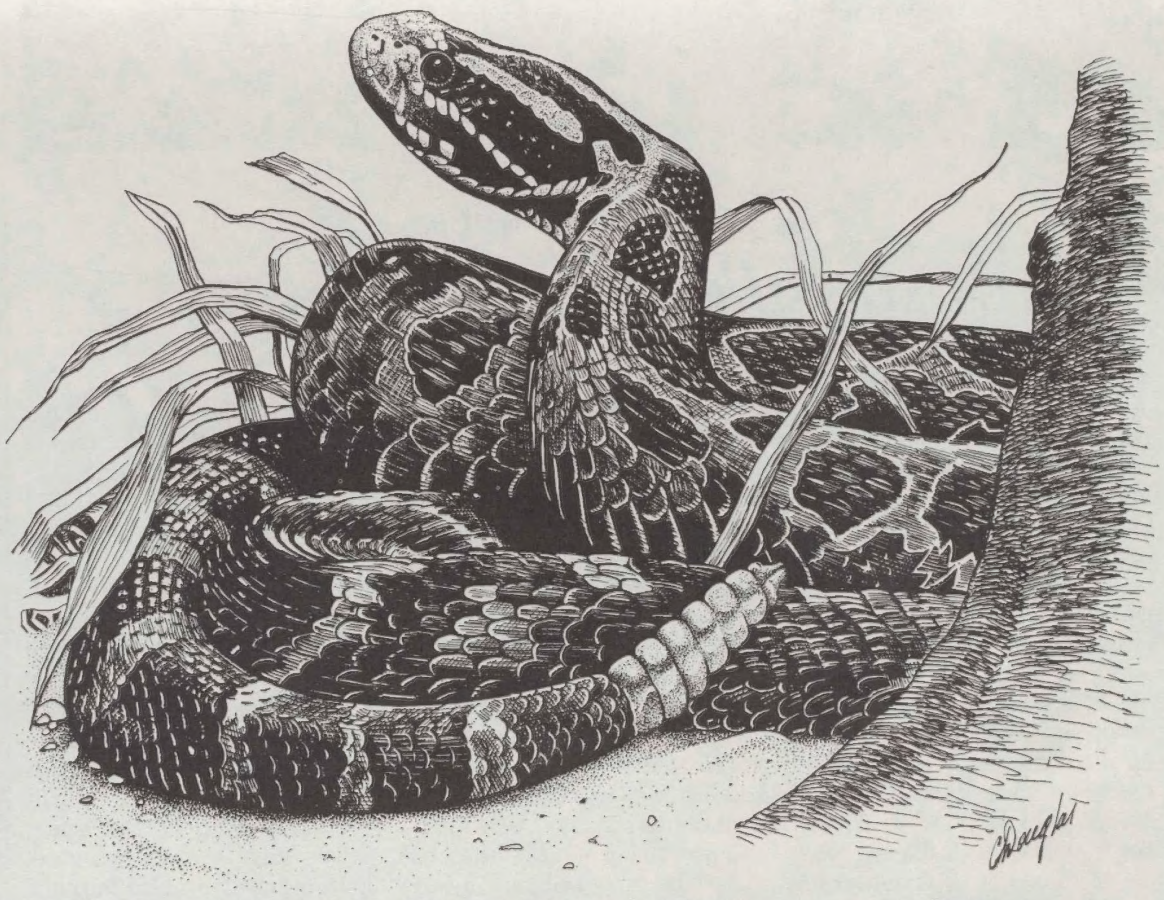
Nature Trivia:

Amphibians and Reptiles

From various "Neotoma" articles by Francis R. Cook

Did you know that...?

Snakes often den for the winter and a favourable local site may be the gathering point in the fall for hundreds, even thousands, of snakes that had dispersed for summer feeding. Dens are most commonly in rocky areas where cracks and crevices lead down beyond the point where winter frost will penetrate.



The three species of rattlesnakes recorded in Canada are the only poisonous snakes in this country.

The Wood Frog ranges far north into Labrador and the Yukon (and Alaska), even crossing the arctic circle within the shelter of the wooded MacKenzie River Valley in the Northwest Territories.

Rural folklore ascribes to the Milk Snake the ability to milk cows, and some farmers blame a dry cow on the snake's presence. This is pure fantasy, as the snake has neither the capacity to hold a significant volume of milk, nor the ability to extract it — its needle sharp teeth would soon try any cow's patience!

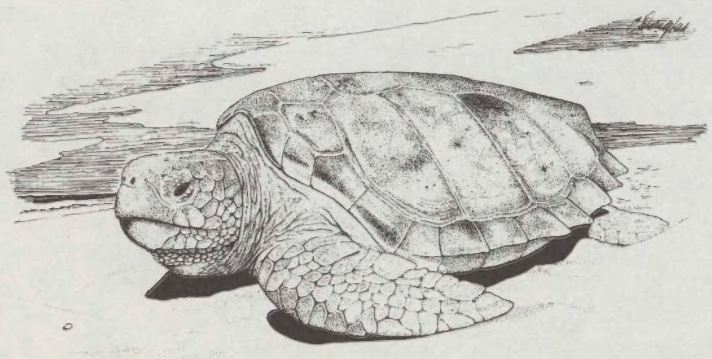
The Short-horned Lizard possesses the ability to rupture a blood vessel at the base of the nictitating membrane (a movable but transparent "inner" eyelid) and actually squirt blood from the eye.

The Bullsnake and the Black Rat Snake sometimes grow to over 2.4 m.

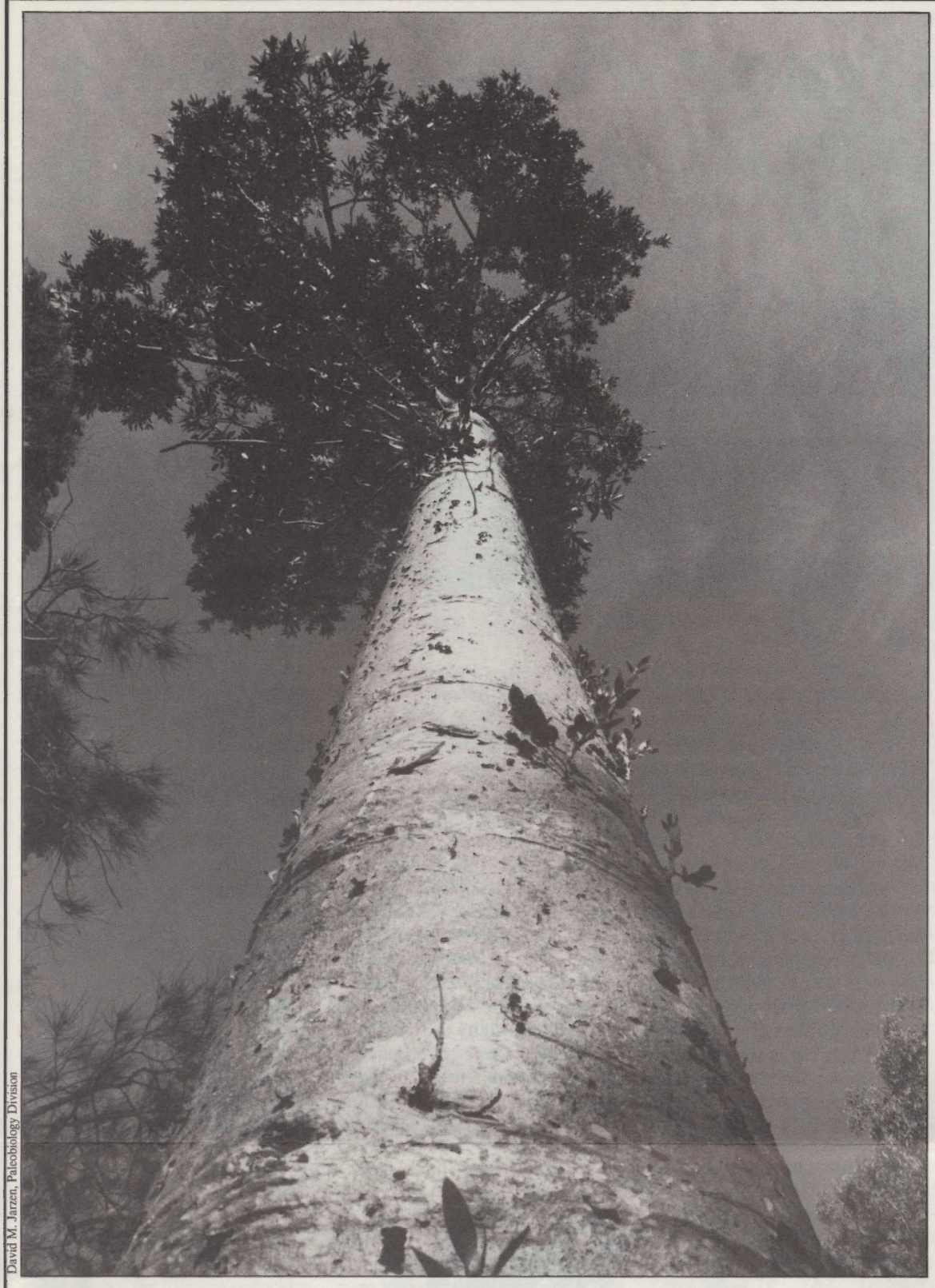
The European salamander was credited in ancient times with the ability to endure fire and extreme heat, and the term has been secondarily applied to cooking utensils and other objects that can withstand high temperatures. The myth that this moisture-loving animal liked fire may have originated when logs in which salamanders were hiding were put into a fire and the amphibians quickly emerged — not to enjoy the heat but to flee from it!

While all snakes lack legs, most boas have "spurs" (tiny, almost unnoticeable remnants of hind legs) that indicate the descent of snakes from more conventional reptiles.

The Loggerhead Turtle reaches a carapace (top shell) length of at least 122 cm and a weight of 227 kg.



The tiny Chorus Frog grows to only about 3 cm.



David M. Jarzen, Paleobiology Division

A View from Down Under:

Bushwalking in Gondwana

Prior to 110 million years ago, South America, Africa, India, Antarctica and Australia were united in a larger continental landmass called Gondwana. Ancient Gondwana was situated at the South Pole.

About 95 million years ago, this landmass began to break apart as a result of continental drifting and sea-floor spreading. The several blocks that became the southern continents slowly moved towards their current positions. Australia reached its present position about 20,000 years ago. It is still drifting northward towards Papua New Guinea at about 10 millimetres a year. In about 60 million years, it will be situated wholly within the tropics and will have collided with Asia.

During the Early Cretaceous, about 140 million years ago, the flowering plants (angiosperms) first appeared in the fossil record. These early angiosperms underwent rapid evolution and diversification and soon spread throughout the world, including all parts of Gondwana. However, the break-up of Gondwana had separated existing plant communities by the end of the Cretaceous (about 65 million years ago). The isolation, extinction and migration of plants has led to the present-day plant communities.

One particular plant group, the Southern Beeches (*Nothofagus*), bears witness to the splitting and eventual isolation of many flowering plants. With the separation and drifting of Gondwana blocks, the Southern Beeches were rafted to their present distribution. In Australia, they occur only in the lush, cool temperate rainforests of southeastern Australia, such as Lamington National Park in the southeastern corner of Queensland.

Bushwalking through the park's many trails carried me back, if only in my imagination, to a part of ancient Gondwana. As well as Southern Beeches, the forests of Lamington National Park are replete with other "Late Cretaceous" plants, including mammoth conifers, Hoop Pine (*Araucaria cunninghamia*) and podocarps; there are also giant tree ferns, old twisted, butressed fig trees, impressive stands of the pink-barked brush box tree (*Tristania conferta*) and smaller specimens of the family Winteraceae, a unique and ancient family of flowering plants whose fossil record can be traced continuously back to about 65 million years ago. Surrounded by this "Cretaceous environment," coupled with the sounds of parrot-like rosellas and sulphur-crested cockatoos, it was not difficult for me to imagine an encounter with a small, forest-adapted dinosaur.

The tall, massive bole of an araucarian towers above the rainforest community at Lamington National Park, Australia.

Lamington National Park is one of Australia's natural treasures. Its forests are living evidence of a once greater landmass, where ancient flowering plants evolved, migrated and diversified to their present dominant role.

David M. Jarzen
Paleobiology Division
Visiting Scholar
University of Queensland

Readers may learn more about Gondwana and its ancient plant life through the beautiful and profusely illustrated book, The Greening of Gondwana, *by Mary E. White, Reed Books Pty. Ltd., New South Wales 2086, Australia, first published in 1986.*

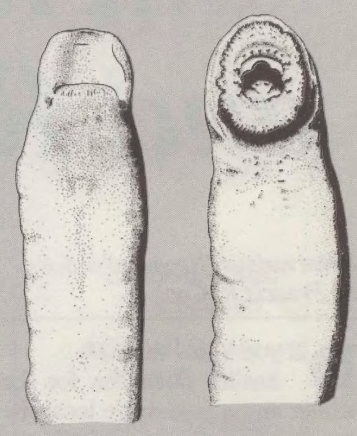
Jawless Fish with an Economic Bite!

The NMNS Ichthyology Section has been very fortunate in receiving a large bequest of lampreys from the late Professor V.D. Vladykov (see *BIOME* Vol. 6:3). Lampreys are as different from the true, bony fish as birds are from mammals and workers on them tend to be specialists. Such work is complicated by the nature of lamprey anatomy. As well as lacking jaws, lampreys have no paired fins (i.e., pectoral and pelvic fins), no scales, and many other features generally found in bony fish are absent. They present few characteristics that can be counted, measured, or otherwise recorded. Lamprey species are primarily distinguished and related by counts of myomeres, or muscle bands, along the body and by the numbers and arrangement of teeth on the sucking disc of adults. The larval lampreys, known as ammocoetes, lack even teeth and feed by filtering minute plants and animals from the water.

Despite their esoteric nature, lampreys have received considerable press coverage as they are reported to be making a comeback in the Great Lakes. Certain lamprey species are nonparasitic, fasting during their whole adult life, whereas others are parasitic, sucking blood and rasping flesh from other fish and occasionally attaching to a horrified human (they are "easily" pulled off). Some parasitized fish are weakened, others die, and many are rendered unappetizing by the scars left by the strong lamprey teeth. There is a major loss to commercial and sport fisheries and large sums of money are spent in efforts to control lamprey numbers in Canada and the U.S. An average parasitic sea lamprey destroys 9 kg of fish and as many as 25,000 lampreys have been counted entering a single stream to spawn.

Chemicals are used to poison lampreys in their larval stage when they lie buried in mud or silt in rivers and streams. It is only when lampreys are concentrated like this that effective control measures can be applied. The Great Lakes are simply too vast. Since not all lamprey adults are parasites, it is important to distinguish which species are living in which stream or lampricide use will be uneconomic. Museum collections can play an important role in this problem. Larval lampreys are notoriously hard to identify to species and it is only with careful study of hundreds of specimens with good comparative material from the whole range of the various species that practical keys for identification can be made. This is a typical museum study, since only museums store collections of species from many areas and countries.

The collection of lampreys in the National Museum of Natural Sciences is, we believe, the best in the world. We have over one third of the world's types, those invaluable specimens on which species are founded and first described. We have representatives of virtually all species including some from remote areas such as the Yalu River on the China-North Korea border, Chile, Iran, and Siberia. The number of specimens in the collection is believed to exceed 20,000 and we still have much to identify and catalogue after a year and a half's work.



Ventral view of head region of larval (ammocoete) on the left and adult nonparasitic lamprey on the right. Notice the absence of teeth in the ammocoete and their presence in the adult.

We expect this major collection to be a fruitful source of knowledge and original research in the future as well as a historically important record of lamprey distribution and taxonomy.

By the way, there are two and possibly three lamprey species (one parasitic and one or two nonparasitic) in the National Capital Region.

Brian W. Coad
and
Claude B. Renaud
Zoology Division